

10/511702

DT01 Rec'd PCT/PTO 15 OCT 2004

Amendments to the Claims

This listing of claims will replace the originally filed claims in the application.

Listing of Claims:

Claims 1 – 11 (cancelled).

Claim 12 (new): A method which may be used for simultaneously producing hydrogen and carbon monoxide, said method comprising:

- a) receiving a synthesis gas from a synthesis gas production unit, wherein said synthesis gas comprises hydrogen and carbon monoxide;
- b) decarbonating said synthesis gas in a decarbonation unit;
- c) desiccating said synthesis gas in a desiccation unit;
- d) cryogenically separating said desiccated synthesis gas in a cryogenic separation unit; and
- e) recycling a gas, containing at least about 60% hydrogen, upstream of said decarbonation unit and downstream of said synthesis gas production unit, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
 - 1) a gas from said cryogenic separation; and
 - 2) a portion of a gas upstream of said cryogenic separation unit.

Claim 13 (new): The method of claim 12, wherein said portion of a gas upstream of said cryogenic separation unit comprises a portion of said desiccated synthesis gas.

Claim 14 (new): The method of claim 12, wherein said synthesis gas comprises a gas from hydrogen reforming.

Claim 15 (new): The method of claim 12, further comprising withdrawing said gas to be recycled from the top of a methane scrubbing column in said cryogenic separation unit.

Claim 16 (new): The method of claim 12, wherein the gas produced with the highest hydrogen purity comprises said gas containing at least about 60% hydrogen.

Claim 17 (new): The method of claim 12, further comprising regenerating said desiccation unit with said gas containing at least about 60% hydrogen prior to sending said gas containing at least about 60% hydrogen upstream of said decarbonation unit.

Claim 18 (new): The method of claim of claim 12, further comprising compressing said decarbonated synthesis gas in a compressor prior to sending said decarbonated synthesis gas to said desiccation unit.

Claim 19 (new): The method of claim 17, further comprising sending a second gas to a location upstream of said compressor and downstream of said decarbonation unit, wherein said second gas is enriched with hydrogen from said cryogenic separation.

Claim 20 (new): An apparatus which may be used for substantially simultaneously producing hydrogen and carbon monoxide, said apparatus comprising

- a) a means for receiving a synthesis gas from a synthesis gas production unit;
- b) a decarbonation unit;
- c) a desiccation unit;
- d) a cryogenic separation unit;
- e) a means for connecting said synthesis gas production unit with said decarbonation unit;
- f) a means for connecting said decarbonation unit with said desiccation unit;
- g) a means for connecting said desiccation unit with said cryogenic separation unit; and
- h) a means for withdrawing hydrogen and carbon monoxide as products, wherein said withdrawing means comprises a means for recycling a gas containing at least about 60% hydrogen, wherein said gas to be recycled comprises at least one member selected from the group consisting of:
 - 1) a gas from said cryogenic separation; and
 - 2) a portion of a gas upstream of said cryogenic separation unit.

Claim 21 (new): The apparatus of claim 20, wherein said portion of a gas upstream of said cryogenic separation unit comprises a portion of said desiccated synthesis gas.

Claim 22 (new): The apparatus of claim 20, wherein said products are withdrawn upstream of said decarbonation unit and down stream of said synthesis gas production unit.

Claim 23 (new): The apparatus of claim 20, further comprising a compression means located downstream of said decarbonation means.

Claim 24 (new): The apparatus of claim 20, further comprising a means for sending said hydrogen enriched gas to said desiccation unit.

Claim 25 (new): The apparatus of claim 20, wherein said cryogenic separation unit comprises:

- a) a methane scrubbing column;
- b) a stripping column;
- c) a rectifying column; and
- d) a means for withdrawing said hydrogen enriched gas from said methane scrubbing column.

Claim 26 (new): The apparatus of claim 25, further comprising a means for sending a hydrogen enriched gas from the stripping column to a location downstream of said decarbonation unit.